

INDEX

A

Abscissa, 320
Absolute accuracy 178
Absorption and scattering, 156
Accuracy, 341
Accuracy, digital chart 212
Acoustic Doppler current profilers, 439
Acute angle, 317
Acute triangle, 318
Additional Secondary Phase Factor (ASF) 178
Adjacent angle, 317
Adjusting barometer readings, 521
Adjustment of departure time, 555
Adjustment of SOA, 555
Advance, 107
advance 107
Advanced piloting techniques, 122
Advection fog, 496
Aeronautical lights, 65
Agulhas Current, 436, 438
Aids to navigation system, 63
Air Almanac, 287, 288
Air masses, 489
Alaska Current, 437
Aleutian Current, 437
Allowances for Non-Uniform Propagation Rates 178
Almanacs, 58, 287, 378
Altering a great circle track to avoid obstructions, 350
Alternating current, 151
Alternating light, 66
Altitude correction, 297
Altitude intercept (a), 296
Altitude measurement, 378
Alto, 528
Altocumulus (Ac), 531
Altostratus (As), 530
Amplitude modulation (AM), 159
Amplitude of radio waves, 151
Amplitude of the sun by calculation, 274
Amplitudes, 271, 273, 331
AMVER participation, 400
AMVER plot information, 401
AMVER reporting, 401
Anabolic wind, 493
Anchorage, 121
Anchoring procedures, 119
Anemometer, 523

Aneroid barometer, 519
aneroid barometer 519
Angle, 317
Angle of magnetic dip, 82
Angular length, 320
Angular measure, 320
Annular eclipse, 233
Anomalistic month, 134
Antarctic Circle, 230
Antarctic Circumpolar Current, 434
Antenna characteristics, 157
Anthelion, 498
Anticrepuscular rays, 499
Anticyclone, 492
Antilles Current, 435
Antipodal, 345
Antipode, 130
Antiselene, 498
Aphelion, 219
Apogean tides, 134
Apogee, 219
Apparent horizon, 238
Apparent motion, 218, 226
Apparent solar day, 275
Apparent solar time, 275
Apparent wind, 523
apparent wind 523
Arc, 262, 277
Arctic Circle, 230
Arctic sea smoke, 496
Area calls, 396
Areas to be avoided, 383
Aries, 230
Artificial horizon, 268
Artificial horizon sextants, 268
Assumed latitude, 300
Assumed longitude, 300
Assumed position (AP), 296
Astronomic latitude, 16, 234
Astronomic longitude, 17, 234
Astronomical Almanac, 287
Astronomical distances, 219
Astronomical triangle, 246
Astronomical unit (AU), 219
Athwartship (A) coil, 89
Atlantic ocean currents, 434
Atmosphere, 481

- Atmospheric electricity, 499
 Atmospheric noise, 157
 Atmospheric pressure, 519
 Attenuation, 156, 188
 Aureole, 498
 Aurora, 500
 Aurora Australis, 500
 Aurora Borealis, 500
 Auroral zones, 500
 Automated Mutual-Assistance Vessel Rescue System (AMVER), 399
 Autumnal equinox, 229
 Azimuth angle (Z), 241, 331
 Azimuth of polaris, 272
 Azimuth of the sun, 271
 Azimuthal equidistant projection, 23, 31
 Azimuthal orthomorphic projection, 30
 Azimuthal projection, 23, 29
 Azimuths, 241, 271
- B**
- Back sight, 264
 Backstays of the sun, 499
 Backwash, 449
 Baily's Beads, 233
 Bank cushion, 121
 Bank suction, 121
 Barograph, 520
 barograph 520
 barometer 519
 Barometric pressure, 519
 barometric pressure 519
 Barometric pressure, analysis of, 514
 Baseline, 17
 baseline 176
 baseline extension 176
 baseline length (BLL) 174
 baseline travel time (BTT) 174
 Basins, 430
 Bathymetric charts, 40
 Beach sediments, 451
 Beacons, 63, 78
 Beam compasses, 105
 Beam width, 410
 Bearing (B, Brg.), 5
 Bearing record book, 110
 Beaufort Scale of wind force, 537
 Bells, 71
 Benguela Current, 436, 438
 Bergy bit, 454
 Biquadrantal spherical triangle, 327
 Bisects, 318
 Blind lead, 457
 blink coding 175
 Blizzard, 494
- Boat sheet, 410
 Bobbing a light, 56
 Body at rising, 377
 Body at setting, 377
 Body in zenith, 382
 Body on prime vertical, 377
 Bolide, 224
 Bora, 494
 Bore, 134, 447
 Bottom contour charts, 40
 Bottom description, 40
 Bottom relief, 430
 Brazil Current, 436
 Breaker, 444
 Breakers, classes of, 448
 Bridge lights, 65
 British Thermal Unit (BTU), 522
 Bummocks, 473
 Buoy lights, 71
 Buoy moorings, 71
 Buoyage systems, 73
 Buoyant beacon, 63
 Buoys, 70
 Buys Ballot's Law, 513

C

- Calculations of meteorology, 332
 Calculations of piloting, 329
 Calculations of the sailings, 331
 Calculator keys, 329
 Calculators in navigation, 329
 Calendar, 232
 California Current, 436
 Calve, 454
 Can, 74
 Canary Current, 436
 Cape Horn Current, 436
 Cardinal marks, 73
 Cartesian coordinates, 320
 Cat's paw, 494
 Catalogs, 59
 Cathode ray tube (CRT), 197
 Causes of tides, 129
 Celestial equator, 234
 Celestial horizon, 238
 Celestial meridian, 234
 Celestial navigation routine, 314
 Celestial sphere, 218, 234
 Celestial triangle, 246
 Celsius (C) 521
 Centering error, 267
 Centesimal degrees, 321
 Centesimal system, 321
 Central angle, 319
 Centroid, 318

- Characteristics of lights, 66
Chart accuracy, 35, 412
Chart catalogs, 49
Chart classification by scale, 35
Chart database, 200
Chart dates, 37
Chart features, 43
Chart graticule, 24
Chart lettering, 38
Chart lighting, 50
Chart No. 1, 38, 58
Chart numbering system, 45
Chart numerical scale, 34
Chart preparation, 106, 368
Chart projection, 23
Chart reading, 37
Chart scales, 34
Chart sounding datum, 41
Chart soundings, 40
Chart symbols, 38
Chart symbols and abbreviations, 77
Chinook, 493
Chipping rate, 165
Chlorinity, 426
Chord, 319
Chronometer, 269
Chronometer error (CE), 6, 278
Chronometer rate, 269, 278
Chronometer time, 278
Chronometers, 269
Circle of equal altitude, 295
Circles, 319
Circulation of the atmosphere, 481
Circumference, 319
Circumhorizontal arc, 498
Circumscribed circle, 318
Circumscribed halo, 498
Circumzenithal arc, 498
Cirrocumulus (Cc), 530
Cirrostratus (Cs), 529
Cirrus 528
Cirrus (Ci), 528
Clamp screw vernier sextant, 263
Climate, 481
Cloud Formation 527
Cloud formation, 527
Cloud height measurement, 535
Clouds 527
Clouds, 527
Clutter, 189
Coaltitude, 6
Coarse acquisition code, 163
Coast Earth Stations (CES), 395
Coast Pilots, 52
Coastal charts, 35
Coastal current, 433
Coastal phase, 2
Coastal refraction, 154
Code division multiple access (CDMA), 163
Codeclination, 6
coding delay (CD) 174
Cold front, 489
Cold wall, 435
Collecting survey data, 410
Collimation error, 267
Collision with buoys, 70
Colors of lights, 74
Colors of marks, 74
Comets, 224
common establishment 136
Common tangent, 319
Communications, 555
Comparing watch, 269
Compass checks, 369
Compass compensation, 81, 89
Compass error, 97
Compass operation, 86
Compasses, 2
Compensating coils, 91
Complementary angle, 317
Composite sailing, 345, 346, 350
Compressibility, 427
Computed altitude (hc), 296, 331
Computer Sight Reduction 295
Concentric, 319
Conductivity-temperature-depth (CTD), 426
Cone topmark, 74
Congruent, 318
Conic projection, 27, 28
Conical buoy, 74
Conn, 112
Conning Officer, 112
Constellations, 224
Continental shelf, 430
Continental slope, 430
Coordinate systems, 237
Coordinates, 16, 320
Corona, 220, 233, 498
Corposant, 500
Correcting and Uncorrecting the Compass 97
Correcting compass, 86
Correctors, 84
COSPAS/SARSAT participants, 405
Counterglow, 224
Course deviation, 214
Course line, 99
Cracks in ice, 457
Crepuscular rays, 499
Critical point approach, 214
Cross check lines, 409

Cross-track error, 214
 Cumulonimbus (Cb), 535
 Cumulus (Cu), 528, 533
 Current, 102
 Current diagrams, 148
 Current ellipse, 138
 current ellipse 139
 Current meters, 142
 Current rose, 139
 Cycle, 151
 Cyclone, 492
 Cygnus, 257
 Cylindrical projection, 23, 24

D

Damp haze, 496
 Danger bearings, 108
 Danger ranges, 108
 Danger soundings, 108, 368
 Dangerous semicircle, 514
 dangerous semicircle 514
 Date line, 278
 Datum, 19, 214
 Datum connections, 19
 Datum shifts, 21
 Davidson Current, 436
 Day, 232
 Daybeacons, 63
 Dayboards, 63
 Daymark, 63
 Dead reckoning (DR), 375
 Dead reckoning plot, 99
 Dead water, 447
 Deck ice, 496
 Deck log, 110, 376
 Declination, 235
 Declination of a planet, 290
 Declination of a star, 290
 Declination of the moon, 289
 Declination of the sun, 289
 Deep, 430
 Deep Scattering Layer (DSL), 416
 Deep-Water route, 383
 Defense Mapping Agency, 10
 Defense Mapping Agency Hydrographic Center 10
 Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC) 10
 Degaussing, 88, 95, 96
 Degaussing coils, 89
 Degaussing compensation, 88, 89, 91, 95
 Degaussing effects, 91
 Degaussing folder, 89
 Degaussing stations, 89
 Degaussing system, 91

Degrees, 320
 Demarcation line, 109
 Density, 427
 Departure (p, Dep.), 4, 100, 346
 Deperming, 91
 Depressed pole, 239
 Depth contours, 40
 Depth conversion scale, 40
 Depths and datums, 40
 Developable surface, 23
 Deviation, 3, 84, 97
 Diameter, 319
 Difference of latitude (l, Dlat.), 4, 346
 Difference of longitude (DLo), 4, 346
 Differential GPS (DGPS), 170
 Diffraction, 155, 188
 Digital Nautical Chart, 206
 Digital Nautical Chart (DNC), 209
 Digital Selective Calling (DSC), 398
 Dihedral angle, 317
 Dip, 297
 Dip correction, 330
 Dip of the sea short of the horizon, 330
 Direct, 151
 Direct current, 151
 Direct motion, 222
 Direction on the earth, 5
 Directional light, 64
 Directional sector light, 64
 Display and Control Subsystem (DCS), 209
 Dissemination systems, 281
 Distance (D, Dist.), 346
 Distance by vertical angle, 330
 Distance on the earth, 4
 Distance to the radar horizon, 330
 Distance to the visible horizon, 330
 Distances Between Ports (Pub. 151), 58
 Diurnal circle, 226, 235
 Diurnal tide, 133
 Diversion, 555
 DNC corrections, 211
 DNC portfolio, 209
 Doldrums, 484
 Double high water, 134
 Double low water, 134
 Drag circle, 121
 Drift, 102, 110, 139
 Drift currents, 433
 Drift of sea ice, 460
 Dry haze, 496
 dual rating 174
 Dual frequency correction techniques, 170
 Duration of slack water, 147
 Dust whirl, 494

E

E layer, 153
 Earth, 3, 221
 East Auckland Current, 437
 East Australian Current, 437
 East Cape Current, 437
 East Greenland Current, 438
 East Wind Drift, 434
 Easterly wave, 508
 Ebb, 139
 ECDIS Correction System, 210
 ECDIS Outputs, 204
 ECDIS Performance Standards, 200
 ECDIS warnings and alarms, 204
 ECDIS-N, 208
 Echo sounders, 410
 Eclipse of lights, 66
 Eclipses, 233
 Ecliptic, 221, 228
 Eddy viscosity, 428
 Effect of ice on waves, 444
 Effects of currents on waves, 444
 Effects of wind on the sea, 525
 Ekman layer, 433
 Ekman pumping, 433
 Ekman spiral, 434
 Ekman transport, 433
 Electric psychrometer, 523
 Electrical conductivity, 429
 Electromagnetic spectrum, 152
 electronic 199
 Electronic chart, 23
 electronic chart 199
 electronic chart data base 199
 electronic chart display and information system, 199
 Electronic Chart Display and Information System (ECDIS),
 13, 200
 Electronic chart display characteristics, 202
 Electronic Chart Standards, 202
 electronic chart system, 199
 Electronic Chart Systems (ECS), 200
 Electronic Charts, 199
 Electronic Charts, correcting 210
 Electronic charts, using, 212
 electronic navigation chart, 199
 electronic navigation chart database, 199
 Electronic navigation reports, 419
 Electronic Navigational Chart, 205
 Electronic Notice To Mariners, 60
 Electronic systems, 8
 Elevated pole, 239
 Ellipsoid, 16
 Ellipsoid of revolution, 16, 221
 Emergency navigation, 373
 Emergency navigation kit, 373

emission delay (ED) 174
 Endless tangent screw vernier sextant, 263
 Energy of waves, 445
 Enhanced Group Call (EGC), 396
 envelope-to-cycle difference (ECD) 174
 Epicenter, 446
 EPIRB's (Category I, II), 403
 EPIRB's (Class A, B, S), 403
 EPIRB's (Inmarsat-E), 403
 EPIRB's, alarm, warning, and alerting signals, 405
 EPIRB's, testing, 404
 Equation of time, 232, 276
 Equatorial Countercurrent, 437
 Equatorial jet, 437
 Equatorial tides, 134
 Equatorial undercurrent, 438
 Equiangular, 318
 Equilateral triangle, 318
 Equinoctial, 234
 Equipment inventory, 368
 Error, 341
 Error circle, 101
 Errors in piloting, 125
 Established direction of traffic flow, 383
 Estimated position, 100, 102
 Estimated speed made good, 103
 estimated time of arrival 111
 Estimated track made good, 103
 Estimating the wind at sea, 525
 European datum, 19
 Evasion, 555
 Evolutions prior to piloting, 111
 Expendable bathythermograph (XBT), 426
 Explement, 317
 Exterior angle, 318
 Extremely high frequency, 158

F

F layer, 153
 Fading, 155
 Fahrenheit (F), 521
 Fall wind, 494
 Fallibility of buoys, 72
 False echoes, 192
 False shoals, 416
 Fast ice, 457
 Fata morgana, 497
 Fathom, 3
 Fathometer, 119
 Fathometer log, 110
 Fathometer operating guidelines, 369
 Fault lines, 425
 Federal Radionavigation Plan, 160
 Fetch, 441, 526
 fetch 525

Filling, 492
 Finding the vertex, 350
 Fireball, 224
 Fischer plotting, 196
 Fix by range and distance, 115
 Fix by two bearing lines, 111
 Fix by two ranges, 115
 Fix expansion, 101
 Fixed lights, 63
 Fixing position, 196
 Flashing, 91
 Flashing light, 66
 Flaw lead, 457
 FleetNET, 396
 Flinders bar, 85
 Floating derelicts, 414
 Flood, 139
 Florida Current, 435
 Fog, 496, 527, 548
 Fogbow, 498
 Forecasting weather, 500
 Forecastle (F) coil, 89
 Foreign chart reproduction, 45
 Fractures, 457
 Frazil ice, 456
 Frequency, 151
 Frequency modulation (FM), 159
 Fresnel lenses, 63
 Friendly ice, 473
 Frigid zones, 230
 Front range light, 64
 Frontal zone, 489
 Fronts, 489
 Frost smoke, 496
 Fundamental identities, 324

G

Galactic nebula, 225
 Galileo System 172
 Gauss, 89
 Gaussian error, 88
 Gegenschein, 224
 General charts, 35
 General circulation, 485
 General direction of buoyage, 74
 General precession, 230
 Generator, 151
 Geocentric latitude, 17, 234
 Geodesic, 3
 Geodesy, 15
 Geodetic latitude, 17, 234
 Geodetic longitude, 17, 234
 Geodetic survey, 17
 Geodetic systems, 19
 Geographic latitude, 234

Geographic longitude, 234
 Geographic range, 55
 Geoid, 15
 Geoidal heights, 16
 Geoidal horizon, 238
 Geoidal separations, 16
 Geoidal undulations, 16
 Geometric dilution of precision (GDOP), 168
 Geometrical horizon, 239
 Geometry, 317
 Geostrophic equilibrium, 434
 Geostrophic wind, 482
 GHA increment, 299
 Glacier, 453
 Glasses shade, 262
 Global Maritime Distress and Safety System, 393
 Global Positioning System (GPS), 9, 163
 Globular clusters, 225
 Gnomonic projection, 24, 29
 Gongs, 71
 GPS, 161
 GPS signal coding, 165
 Gradient wind, 482
 Graduation errors, 267
 Gravity waves, 441
 Gray-white ice, 456
 Grease ice, 456
 Great circle, 3, 319, 345
 Great circle charts, 30, 346
 Great circle sailing, 346
 Great circle sailing by chart, 346
 Great circle sailing by computation, 349
 Great circle sailing by sight reduction tables, 346
 Great circle track, 5, 345
 Great Lakes ice, 477
 Green flash, 498
 Greenwich, 233
 Greenwich Hour Angle (GHA), 235, 237
 Grids, 34
 Ground swell, 444
 Groundwave, 154
 Group calls, 396
 group repetition interval (GRI) 175
 Group time delay, 169
 Group velocity, 443
 Growler, 454
 Guinea Current, 436
 Gulf Stream, 435
 Gust, 494
 Gyrocompass, 3

H

Halos, 498
 Hand over word (HOW), 166
 Handle, 262

- Harbor charts, 35
 Harbor/harbor approach phase, 2
 Harmonic constants, 143
 Harvest moon, 224
 Haze, 496
 Heading relationships, 97
 Heat lightning, 499
 hecto pascal (hPa) 519
 Heeling coil, 91
 Heeling magnet, 85
 Height error 521
 Heights, 41
 Hertz, 151
 Hevelian halo, 498
 High Clouds 528
 High clouds 528
 High frequency, 157
 High tide, 131
 High water datums, 138
 Horizon glass, 262
 Horizontal datum, 19
 Horizontal geodetic datum, 17
 Horns, 71
 Horse latitudes, 485
 Hostile ice, 473
 Hour circle, 235
 Hull speed in knots, 329
 Humboldt Current, 437
 Humidity, 522
 Hummock, 457
 Hummocked ice, 457
 Hunter's moon, 224
 Hurricane, 503, 507
 Hydraulic current, 139
 Hydrograms, 59
 Hydrographic surveys, 409
 Hydrography, 409
 Hygrometer, 523
 hygrometer 523
 Hypotenuse, 318
- I**
- IALA Cardinal Marks, 74
 IALA Isolated Danger Mark, 75
 IALA Lateral Marks, 73
 IALA Maritime Buoyage System, 73
 IALA New Dangers, 76
 IALA Region A, 73
 IALA Region B, 73
 IALA Safe Water Marks, 76
 IALA Special Marks, 76
 Ice, 414, 453, 527, 549
 Ice accretion, 496
 Ice blink, 468
 Ice cake, 456
 Ice cap, 453
 Ice, density of, 460
 Ice detection, 467
 Ice field, 456
 Ice floes, 456
 Ice forecasts and observations, 477
 Ice front, 454
 Ice islands, 457
 Ice keels, 473
 Ice operations, 470
 Ice products and services, 478
 Ice rind, 456
 Ice shelf, 457
 Ice wall, 454
 Iceberg drift, 461
 Icebergs, 453, 457
 Icebergs in the North Atlantic, 463
 Identification of stars, 247
 IMO performance standards, 201
 Index arm, 262
 Index correction, 297
 Index error, 268
 Index mirror, 262
 Indian datum, 19
 Indian Ocean Currents, 437
 Indian spring low water (ISLW), 137
 Induced magnetism, 88
 Inertial navigation system, 9
 Inferior conjunction, 221
 Inferior mirage, 497
 Inferior planets, 221
 Infrared, 497
 Inland Waterway phase, 2
 Inmarsat (International Maritime Satellite Organization), 395
 INMARSAT B, 395
 INMARSAT C, 395
 Inscribed angle, 319
 Inscribed circle, 318
 Inshore current, 433
 Inshore traffic zone, 383
 Instrument error 521
 Integrated bridge, 199
 Integrated Bridge System, 207
 Intercardinal coils, 92
 Interference, 156
 Interior angle, 318
 Interlaced display, 197
 Internal waves, 447
 International Association of Lighthouse Authorities, 13, 70, 73
 International charts, 45
 International Hydrographic Bureau (IHB), 45
 International Hydrographic Organization (IHO), 11, 45
 International Ice Patrol, 466

International Maritime Organization (IMO), 12
 International Regulations for Preventing Collision, 12
 Interpreting weather, 501
 Intracoastal Waterway aids to navigation, 79
 Inverse trigonometric functions, 325
 Ion, 153
 Ionosphere, 153
 Ionospheric delay errors, 169
 Irminger Current, 435
 Island shelf, 430
 Island slope, 430
 Isobars, 482, 519
 Isophase light, 66
 Isosceles triangle, 318

J

Jamming, 156
 Japan Current, 436
 Jupiter, 223

K

Kamchatka Current, 437, 438
 Katabatic wind, 493
 Knot (kn.), 5
 Kuroshio Current, 436

L

Labrador Current, 435
 Lagging tides, 134
 Lambert conformal projection, 23, 29
 Lamp changer, 66
 Land breeze, 493
 Land Earth Stations (LES), 395
 Land effect, 153
 Land ice, 453
 Land sky, 468
 Large navigational buoys, 71
 Large-scale chart, 35
 Lateral and cardinal systems, 73
 Lateral marks, 73
 Latitude (L, lat.), 4, 234, 346, 549
 Latitude at meridian passage, 309
 Latitude by Polaris, 312
 Latitude determination, 6, 381
 Latitude of the vertex, 332
 Latitudes of points on the great-circle track, 332
 Leads, 457
 Leap seconds, 284
 Leap-second adjustments, 284
 Leeuwin Current, 438
 Leeway, 102
 Length of sea waves, 333
 Length of the day, 382

Lens, 66
 Less dangerous semicircle, 515
 Leveling, 18
 Life of a tropical cyclone, 508
 Light characteristics, 66
 Light Lists, 54
 Light pipes, 64
 Light sectors, 69
 Light-year, 219
 Lighted buoy, 71
 Lighthouses, 63
 Lightning, 499
 Limb, 262
 Line, 317
 Line of apsides, 219
 Line of position, 7, 296
 Line spacing, 409
 List of Lights, 57
 Local apparent noon, 276
 Local Hour Angle (LHA), 235, 237, 300
 Local Mean Time (LMT), 280
 Local Notice To Mariners, 60
 Local time, 232
 Local wind names, 486
 Local winds, 493
 Location vessel, 401
 Log, 3
 Logarithmic function, 322
 Longitude (l, long.), 4, 234, 346
 Longitude at meridian passage, 311
 Longitude determination, 6
 Longitudinal (L) coil, 89
 Longshore current, 433, 450
 Loom, 69
 Looming, 497
 Loop Current, 435
 Loran antenna 174
 Loran C, 161, 173
 Loran C control station 174
 Loran C Signal 174
 Loran C Theory 176
 Loran C transmitting stations 173
 Loran chains 173
 Loran charts 174
 Loran receiver 174
 Low clouds 528
 Low clouds, 533
 Low frequency, 157
 Low tide, 132
 Low Water Datums 136
 Lower branch, 4, 235
 Lower transit, 238
 Lowest low water, 138
 Lowest normal low water, 138
 Loxodromic curve, 4

Luminous range, 54

Lunar day, 232

Lunar distance, 6

Lunar eclipse, 233

Lunar month, 134

Lune, 320

Lunitidal interval, 136

lunitidal interval 136

M

Magnetic adjustment, 84

Magnetic disturbances, 419

Magnetic fields, 84

Magnetic heading, 97

Magnetic poles, 81

Magnetic signature, 89

Magnitude ratio, 219

Magnitudes, 219

Main (M) coil, 89

Maintenance of buoys, 70

Major light, 63

Major wind patterns, 484

Malvinas Current, 436

Maneuvering to avoid the storm center, 514, 516, 517

Manganese nodules, 430

Marcq Saint Hilaire, 58

Marine chronometer, 269

Marine information reports, 418

marine microbarograph 520

Marine radiobeacons, 161

Marine sediments, 430

Marine sextant, 261

Maritime Safety Committee, 207

maritime safety information, 393

Maritime Safety Information (MSI), 393, 396

Maritime Safety Information Website, 60

Mars, 223

master station 173

Mean high water lunitidal interval, 136

Mean latitude (Lm), 346

Mean low water (MLW), 137

Mean low water springs (MLWS), 137

Mean lower low water (MLLW), 137

Mean lower low water springs (MLLWS), 137

Mean sidereal time, 281

Mean solar time, 276

Mean sun, 232, 276

Mean time, 276

Median, 318

Medium frequency, 158

Mercator projection, 23, 24

Mercator sailing, 332, 358

mercurial barometer 519

Meridian altitude, 381

Meridian angle, 237, 239

Meridian passage, 309

Meridian transit, 239, 377

Meridional difference (m), 346

Meridional parts (M), 24, 346

Meteor showers, 224

Meteor swarms, 224

Meteorite, 224

Meteorological equator, 484

Meteors, 224

Metric system, 3

Micrometer drum, 262

Micrometer drum sextant, 261

Microwaves, 152

Mid-latitude (Lm), 4, 346

Mid-latitude sailing, 331, 346, 354

Middle clouds 528

Middle clouds, 530

Military ECDIS, 208

Mindanao Current, 437

Mines, 415

Minimum expected sounding, 368

Minor light, 63

Mirage, 497

Miscellaneous chart features, 43

Mist, 496

Mistake, 341, 344

Mistral, 494

Mixed tide, 133

Mock sun, 498

Modified facsimile charts, 45

Modified Lambert conformal, 32

Modulation, 159

Monsoon, 486

Moon, 223

Moon pillar, 498

Moonbow, 498

Moonrise, 292

Moonset, 292

Moorings, 71

Most probable position (MPP), 343, 374

Multiple star, 225

Multiyear ice, 456

N

Nadir, 235

Napier's Rules, 326

National Imagery and Mapping Agency (NIMA) 10

National Marine Electronic Association (NMEA), 13

National tidal datum epoch, 138

Natural function, 322

Nautical Almanac, 287, 289

Nautical chart, 23

Nautical mile, 3

Nautical miles, 329

Nautical texts, 51

- NAVAIDS, 106
 Navigable semicircle, 515
 Navigation calculations, 329
 Navigation, four phases of, 1
 Navigation system accuracy, 342
 Navigational astronomy, 217
 Navigational error, 341
 Navigational mathematics, 317
 Navigational tables, 8
 Navigational triangle, 6, 246
 Navigator, 112
 NAVSSI block diagram, 209
 NAVTEX, 397
 Navy Navigation Satellite System (NAVSAT), 8, 163
 Neap tides, 134
 Nebula, 226
 Negative pole, 82
 Neptune, 223
 Network Coordination Station (NCS), 395
 Névé, 460
 New danger, 76
 New Guinea Coastal Current, 437
 Ney's projection, 32
 Night effect, 155
 Night observations, 527
 Night orders, 369
 Nilas, 456
 Nimbostratus (Ns), 534
 Nimbus, 528
 No. 2102D 259
 NOAA BSB corrections, 211
 Nodal period, 134
 Nodes, 233
 Noise, 156
 Nominal range, 54
 Nontidal current 138
 Nontidal current, 138
 North American Datum, 1927, 19
 North American Datum, 1983, 21
 North Atlantic Current, 435
 North Cape Current, 435
 North Equatorial Countercurrent, 435, 436
 North Equatorial Current, 435, 436, 437
 North Pacific Current, 436
 North pole, 82
 North wall effect, 548
 Northeast Drift Current, 435
 Northeast trades, 484
 Northeasterlies, 485
 Northern lights, 500
 Norway Current, 435
 Notice To Mariners, 59
 Nova, 225
 nutation 230
- O**
 Oblique angle, 317
 Oblique coordinates, 320
 Oblique gnomonic projection, 29
 Oblique Mercator projections, 26
 Oblique orthomorphic projection, 26
 Oblique plane triangles, 325
 Oblique spherical triangles, 327
 Oblique triangle, 318
 Obliquity of the ecliptic, 228
 Observed altitude (h_o), 296
 Obtuse angle, 317
 Obtuse triangle, 318
 Occluded front, 492
 Occulting light, 66
 Ocean current observations, 439
 Ocean current phenomena, 438
 Ocean current reports, 423
 Ocean currents, 433, 548
 Ocean currents and climate, 438
 Ocean currents, causes, 433
 Ocean Data Acquisition System (ODAS) buoy, 70
 Ocean eddies and rings, 438
 Ocean phase of navigation, 2
 Ocean pressure, 426
 Ocean temperature, 426
 Ocean waves, 441
 Oceanic circulation, 434
 Oceanographic chemistry, 425
 Oceanography, 425
 Octant, 319
 Offshore current, 433
 Omega, 161
 Open cluster, 225
 Opposition, 223
 Ordinate, 320
 Ordnance Survey of Great Britain 1936 Datum, 19
 Origin, 320
 Origin of the oceans, 425
 Orion, 254
 Orthographic projection, 24, 31
 Orthomorphic projection, 30
 Oscillatory wave, 444
 Overfalls, 444
 Overscale, 199
 Oyashio Current, 437
- P**
 Pacific ocean currents, 436
 Pampero, 494
 Pancake ice, 456
 Parallax, 381
 Parallel lines, 317
 Parallel of declination, 235

- Parallel sailing, 331, 346, 354
 Paranthelion, 498
 Parantiselene, 498
 Paraselene, 498
 Paraselenic circle, 498
 Parhelic circle, 498
 Parhelion, 498
 Partial eclipse, 233
 Pegasus, 252
 Perigean spring tides, 134
 Perigean tides, 134
 Perigee, 219
 Perihelion, 219
 Perimeter, 319
 Periodic current, 433
 Permanent magnetism, 82
 Permanent magnets, 85
 Perpendicular lines, 317
 Perpendicularity error, 267
 Perspective projections, 24
 Peru Current, 437
 Phase, 151
 Phase characteristics of lights, 74
 phase coding 175
 Photosphere, 220
 Pillar buoys, 74
 Piloting, 1, 105
 Piloting brief, 110
 Piloting procedures, 117
 Pilots, 2
 Pinnacled iceberg, 455
 Plan position indicator (PPI), 187
 Plane, 317
 Plane geometry, 317
 Plane projections, 24
 Plane sailing, 331, 346, 351
 Plane sailing triangle, 351
 Plane surface, 317
 Plane triangle, 318
 Plane trigonometry, 320
 Planet diagram, 259
 Plates, 425
 Plotting running fixes, 122
 Plotting sheets, 34, 374
 Plotting the DR, 100
 Plunging breaker, 449
 Pluto, 223
 Point, 317
 Point of tangency, 319
 Points along the great circle, 349
 Polar charts, 32
 Polar circles, 230
 Polar coordinates, 320
 Polar distance (p), 237
 Polar front, 485
 Polar frontal jet stream (PFJ), 481
 Polar lights, 500
 Polar projection, 32, 34
 Polar winds, 485
 Polaris, 377
 Polarization, 153
 Polarization error, 155
 Poles, 319
 Polyconic projection, 23, 29
 Polynyas, 457
 Port information reports, 419
 Position reporting systems, 399
 Positive pole, 82
 Practical salinity scale, 426
 Practical salinity units, 426
 Precautionary area, 383
 Precession of the equinoxes, 230
 Precipitation, 527
 Precise positioning service (PPS), 166
 Precision, 341
 Precision code, 163
 Preferred datums, 19
 Presentation Library, 203
 Pressure gradient, 482
 Prevailing westerlies, 485
 Primary, 320
 Primary Phase Factor (PF) 178
 Primary seacoast lights, 63
 Prime meridian, 2
 Prime vertical, 239
 Prime vertical circle, 239
 Priming tides, 134
 Principal vertical circle, 239
 Prismatic error, 267
 Private aids to navigation, 80
 Projections, 23
 Proper motion, 225
 Pseudorandom noise (PRN), 163
 Psychrometer, 523
 psychrometer 523
 Psychrometric tables, 523
 Publication 432 (NIST), 283
 Pulse duration, 187
 Pulse length, 187
 Pulse modulation (PM), 159
 Pulse Repetition Rate (PRR), 187
 Pulse width, 187

Q

- Quadrantal spheres, 85
 Quadrantal spherical triangle, 327
 Quarterdeck (Q) coil, 89
 Quartz crystal marine chronometers, 269
 Quintant, 319

R

Racons, 194
 Radar beacons, 194
 Radar beam, 187
 Radar, development of, 9
 Radar interpretation, 188
 Radar navigation, 1
 Radar operation, 187
 Radar piloting, 196
 Radar ranges, 115
 Radar reflectors, 65, 194
 Radial motion, 225
 Radian, 321
 Radiation fog, 496
 Radio navigation, 1
 Radio Navigational Aids (Pub. 117), 57
 Radio propagation factors, 282
 Radio spectrum, 152
 Radio Technical Commission for Maritime Services, 13, 202
 Radio wave propagation, 157
 Radio waves, 151
 Radioactivity, 429
 Radiobeacons, 161
 Radius of a sphere, 319
 Radius vector, 320
 Rafting of ice, 456
 Rage sea, 445
 Rainbow, 497
 Ramarks, 194
 Rams, 454
 Random errors, 341
 Range lights, 64
 Ranges, 107
 raster chart display system, 199
 Raster format, 199
 raster navigation chart, 199
 Raster navigational chart, 206
 Raster radars, 197
 Ratan (Radar and Television Aid to Navigation), 387
 Rational horizon, 238
 Rear range light, 64
 Receivers, 159
 Recommended direction of traffic flow, 383
 Recommended routes, 383, 384
 Recommended track, 383
 Recording observations, 536
 Rectangular coordinates, 320
 Rectangular projection, 27
 Recurring polynyas, 457
 Reduced soundings, 410
 Reducing a moon sight, 305
 Reducing a planet sight, 307
 Reducing a sun sight, 303
 Reducing star sights, 301

Reflection, 153
 Reflex angle, 317
 Refraction, 188, 381, 444, 448
 Refraction of radio waves, 153
 Region A, 73
 Region B, 73
 Registered Information Provider, 396
 Regression of the nodes, 234
 Regulated waterways, 390
 Regulation of frequency use, 158
 Relative accuracy 178
 relative display mode, 200
 Relative humidity, 522
 Relative motion, 218
 Release, 262
 Repeatable accuracy 178
 Repeatable accuracy, 184
 Representative fraction, 34
 Requirements, ECDIS replacing paper charts, 200
 Resolution in bearing, 189
 Resolution in range, 188
 Retentive error, 88
 Retrograde motion, 222
 Revolution, 219
 Rhumb lines, 4, 345
 Ridge, 456
 Ridging, 456
 Right angle, 317
 Right ascension, 235
 Right line, 317
 Right plane triangles, 325
 Right spherical triangles, 327
 Right triangle, 318
 Rip currents, 450
 Ripples, 441
 Roaring forties, 485
 Rotation, 219
 Rotten ice, 460
 Roundabout, 384
 Route planning and monitoring, 213
 Route reports, 423
 Routing system, 383
 Royal Greenwich Observatory, 11
 Rules of dead reckoning, 100
 Running fix, 115

S

Safe Water Marks, 76
 Safety contour, 214
 Safety of Life at Sea (SOLAS), 12
 Safety report messages, 415
 Safety reports, 414
 SafetyNET, 396
 Sailing charts, 35
 Sailing Directions 2

- Sailing Directions (Enroute), 52
Sailing Directions (Planning Guide), 51
Salinity, 425
Sand bars, 450
Santa Ana, 494
Sargasso Sea, 436
Saros, 234
SART Range 406
Satellite oceanography, 430
Saturn, 223
Scale, 34
Scalene triangle, 318
Sea breeze, 493
Sea ice, 455
Sea ice, drifting, 460
Sea ice, salinity, 460
Sea ice, thickness, 457
sea level pressure 521
search and acquisition 174
Seasonal current, 433
Secant, 319
Secant conic projection, 29
Secchi disk, 429
Second-year ice, 456
secondary coding delay (SCD) 174
Secondary lights, 63
Secondary Phase Factor (SF) 178
secondary stations 173
Sector, 319
Sectors of lights, 69
Segment, 319
Seiche, 447
Seismic sea waves, 446
Semi-circle, 319
Semidiameter, 319, 381
Semidiameter of a sphere, 319
Semidiurnal, 139
Semidiurnal tide, 133
Semimajor axis, 16
Sensible horizon, 238
Separation zone, 383
Set, 102, 110, 139
settle phase 174
Sexagesimal system, 321
Sextant, 319
Sextant care, 266
Sextant errors, adjustable, 267
Sextant errors, non adjustable, 266
Sextant moon sights, 263
Sextant reading, 264
Sextant star sights, 263
Sextant sun sights, 263
Sextant verticle angles, 115
Shade glasses, 262
Shallow water, 526
Shapes of marks, 74
Ship Earth Stations (SES), 395
Ship simulators, 126
Ship's heading, 97
Ship's magnetism, 82
Shoaling, 444
Shoals, 414
Shooting stars, 224
Shore lead, 457
Shore lights, 65
Shuga, 456
Side error, 267
Sidereal day, 232, 275
Sidereal Hour Angle, 230, 299
Sidereal Hour Angle (SHA), 235
Sidereal month, 223
Sidereal time, 232, 280
Sight reduction, 295, 381
Sight reduction procedures, 297
Sight Reduction Tables, 58
Sight Reduction Tables for Marine Navigation Pub. No. 229, 295
Signal range, 157
signal-to-noise ratio (SNR) 179
Simple conic projection, 27
Sinkers, 71
Sinking, 497
Skip distance, 154
Sky coloring, 497
Sky diagrams, 250
Sky map, 468
Skylights, 473
Slack water, 139
Slide Bar 108
Slide bar, 108
Sling psychrometer, 523
Small circle, 3, 319
Small craft charts, 50
Small-scale chart, 35
Smog, 496
Smooth sheet, 410
Snow blink, 468
Solar day, 232
Solar eclipse, 233
Solar prominences, 233
Solar System 219
Solar tide, 133
Solar time, 275
Solar wind, 220
Solid geometry, 317
Somali Current, 437
Sound signals, 78
Sound signals on buoys, 71
Sound speed, 428
Sounding datum, 137

- Sounding reports, 416
 Soundings, 40
 South Atlantic Current, 436
 South Equatorial Current, 434, 437
 South Java Current, 438
 South Pole, 82
 Southeast Drift Current, 435, 436
 Southeast trades, 484
 Southeasterlies, 485
 Southern hemisphere routing, 555
 Southern lights, 500
 Southern Ocean Currents, 434
 Southwest Monsoon Current, 437
 Space coordinates, 320
 Space segment, 395
 Spar, 74
 Special charts, 34
 Special environmental problems, 554
 Special Marks, 76
 Special Notice to Mariners paragraphs, 59
 Special purpose buoys, 78
 Special tidal effects, 134
 Specific heat, 428
 Spectrum, 497
 Speed (S), 5
 Speed made good (SMG), 5
 Speed of a vessel, 329
 Speed of advance (SOA), 5
 Speed over the ground (SOG), 5
 Sphere, 319
 Spherical buoys, 74
 Spherical coordinates, 320
 Spherical triangle, 246, 320
 Spicules, 456
 Spilling breaker, 449
 Spitsbergen Current, 435
 Spring tides, 134
 Squall line, 492
 Squat, 121
 St. Elmo's fire, 499
 Stadimeter ranges, 115
 Standard, 341
 Standard atmosphere, 481
 Standard deviation, 342
 Standard lapse, 481
 Standard parallel, 27
 Standard time broadcasts, 282
 standard zero crossing 174
 Standing orders, 370
 Standing waves, 447
 Star charts, 250
 Star clouds, 225
 Star finder, 250, 259
 Star globe, 250
 Stars, 224, 247
 station pressure 521
 Steering error, 102
 STELLA 295
 Stereographic projection, 24, 30
 Stooping, 497
 Storm surge, 518
 Storm tides, 446, 518
 Storm wave, 518
 Straight angle, 317
 Straight line, 317
 Stratocumulus (Sc), 533
 Stratosphere, 481
 Stratus (St), 528, 534
 Stream, 433
 Sub-tropical jet stream (STJ), 481
 Subastral point, 246
 Sublunar point, 130, 246
 Subpermanent magnetism, 82
 Subsatellite point, 246
 Subsolar point, 246
 Substellar point, 246
 Summary Of Corrections, 59
 Summer solstice, 229
 Sumner line, 8
 Sun 220
 Sun cross, 498
 Sun dog, 498
 Sun pillar, 498
 Sunspots, 220
 Super high frequency, 158
 Super-refraction, 153
 Superior conjunction, 221
 Superior mirage, 497
 Superior planets, 221, 222
 Supernova, 225
 supersaturated 523
 Supplement, 317
 Supplementary angle, 317
 Surf, 444
 Surging breaker, 449
 Swath survey systems, 412
 Sweat, 522
 Swell, 441, 527
 Swing circle, 121
 Synodic period, 222
 Synodical month, 134
 Synoptic oceanography, 432
 Synoptic weather considerations, 549
 system area monitor 174
 system electronic navigation chart, 199
 Systematic errors, 341

T

- Tabular iceberg, 455
 Tabular Sight Reduction 295

- Tabulated declination, 299
Taking a sight, 264
Taking departure, 100
Tangent arc, 498
Tangent, geometric, 319
Tangent screw, 262
Tasman Front, 437
Tehuantepecer, 494
Telescope, 262
Temperate zones, 230
Temperature 521
Temperature error 521
Temperature measurement, 522
Temporary geographic grid (TGG), 34
Tenting, 456
Terrestrial magnetism, 82
Thawholes, 460
The Sailings, 3, 345
Thermal conductivity, 429
Thermal expansion, 428
Thermocline, 426
Thermohaline, 433
thermometer 522
Thunder, 499
Tidal current, 102, 129, 138
Tidal current charts, 147
Tidal current periods and cycles, 140
Tidal current tables, 143, 145
Tidal currents, 143, 526
Tidal cycles, 136
Tidal day, 134
tidal day 136
Tidal heights, 143
Tidal waves, 446, 518
Tide calculations, 330
Tide predictions for reference stations, 144
Tide predictions for subordinate stations, 144
Tide Tables, 144
Tide waves, 447
Time, 232, 275
Time balls, 6
time delay lattice 173
Time diagram, 239
time difference 173
Time meridian, 278
Time of sunrise, 291
Time of sunset, 291
Time sight, 7
Time signals, 283
Tokyo Datum, 19
Topmarks, 74
Torrid zone, 230
Towering, 497
Track made good by plotting running fixes, 122
tracking and lock phase 174
Trackline SURPIC, 401
tractive forces 131
Trade winds, 484
Traffic lane, 383
Traffic separation scheme, 383, 384
Transducer, 410
Transfer, 107
transfer 107
Transit, 161
Transit of the sun, 221
Transition to piloting, 112
Transmissometer, 429, 536
transmissometer 536
Transmitters, 158
Transparency, 429
Transversal, 317
Transverse Mercator projections, 25
Transverse orthomorphic projection, 25
Transverse projections, 23
Traverse, 18, 353
Traverse sailing, 331, 346, 353
Traverse tables, 351
Triangles, 318
Triangulation, 17
Trigonometric functions, 321
Trigonometric identity, 324
Trigonometry, 320
Trilateration, 18
Triquadrantal spherical triangle, 327
Tropic lower low water (TcLLW), 137
Tropic of Cancer, 230
Tropic of Capricorn, 230
Tropic tides, 134
Tropical cyclone, 503
Tropical cyclones, avoidance, 510
Tropical cyclones, locating center, 512
Tropical cyclones: origin, season, and frequency, 503
Tropical depression, 503
Tropical disturbance, 503
Tropical month, 134
Tropical year, 233
Tropopause, 481
Troposphere, 481
true display mode, 200
True heading, 97
True wind, 523
Tsunamis, 446
Tsushima Current, 436
Turbidity currents, 430
turning point 107
Twilight, 291
Two-way route, 384
Types of marks, 73
Types of sailings, 346
Typhoon, 503

U

U.S. Coast and Geodetic Survey, 9
 U.S. Coast Guard Districts, 61
 Ultra high frequency, 158
 Ultraviolet, 497
 Undercurrents, 438
 underscale, 199
 Uniform State Waterway Marking System (USWMS), 80
 United States Coast Guard, 10
 United States Naval Observatory, 11
 United States Navy, 11
 Universal polar stereographic (UPS) grid, 31, 34
 Universal time, 232, 233
 Universal Transverse Mercator (UTM), 26, 34
 Upper air observations, 536
 Upper branch, 235
 Upper meridian passage, 276
 Upper transit, 238
 Uranus, 223
 Ursa Major, 254
 USCG Light Lists, 57
 Use and stowage of charts, 49
 User equivalent range error (UERE), 168
 Using charts, 49

V

Variable stars, 225
 Variation, 3, 82, 97
 Vector format, 200
 Vernal equinox, 229, 275
 Vernier, 262
 Vernier sextant, 263
 Vertex, 317
 Vertical angle, 317
 Vertical datum, 19
 Vertical surveying, 18
 Vertices, 318
 Very high frequency, 157
 Very low frequency, 157
 Vessel Traffic Services (VTS), 386
 Viscosity, 427
 Visibility 536
 Visibility measurement, 536
 Visible horizon, 238
 Volcanic activity, 415
 Voluntary Observation Ship (VOS) program 520
 voyage data recorder, 205
 Voyage preparation, 368
 VTS Houston-Galveston, 388
 VTS New York, 387
 VTS Prince William Sound, 389
 VTS Puget Sound, 388
 VTS San Francisco, 387

W

Warm front, 489
 Warning Sounding, 368
 Warship ECDIS (WECDIS), 210
 Watch circle, 71
 Watch relief procedures, 370
 Watch Time (WT), 280
 Water sky, 468
 Waterspout, 494
 Wave characteristics, 441
 Wave front, 151
 Wave height, 333, 441, 548
 Wave interference, 153
 Wave measurement aboard ship, 445
 Wave period (P), 441
 Wave speed, 333
 Wavelength, 151, 441
 Waves, causes, 441
 Waypoint navigation, 184
 Waypoints, 214
 waypoints 173
 Weather, 481
 Weather advisory, 555
 Weather broadcasts and radiofacsimile, 510
 Weather forecast dissemination, 500
 Weather observations, 519
 Weather routing, 545
 West Greenland Current, 435
 West Wind Drift, 434
 Western Rivers System, 79
 Whistle buoys, 71
 Wind, 548
 Wind driven currents, 433
 Wind measurement, 523
 Wind shifts, 527
 Wind speed, 525
 wind vane 523
 Wind's duration, 525
 Winter solstice, 229
 World Geodetic Reference System (GEOREF), 34, 210
 World Geodetic System, 19
 World Geodetic System of 1960, 20
 World Geodetic System of 1972, 20
 World Geodetic System of 1984, 20
 World Port Index Pub. 150, 58
 Wreck buoys, 71
 Wrecks/man-made obstructions, 415

X

X-shaped topmarks, 74
 xx 199

Y

Year, 232
Young ice, 456

Z

Zenith, 235

Zenith distance, 240
Zenithal projection, 23, 29
Zodiac, 231
Zodiacal light, 224
Zone description (ZD), 278
Zone meridian, 278
Zone time (ZT), 233, 278

